

SCOPE OF WORK
D609-099-RW
Continuous Tracking Advance Detector System

1.0 Description. Provide, install and test continuous tracking advance detector (CTAD) units and cabinet interface to detect range, speed, and vehicle estimated time of arrival (ETA) to the stop bar for vehicles or clusters of vehicles moving on the Northbound and Southbound approaches of US 61 at Interstate 55 SB Exit Ramp in Jefferson County. . The CTAD shall also detect instantaneous roadway efficiency.

Note: *US 61 is a North/South route that runs West/East respectively at this location*

2.0 Notification. The engineer shall be notified at least two weeks in advance of the proposed date of installation. All work is to be completed per submitted completion date, unless approved by the engineer. Best completion date may be a factor in award. Liquidated damages may be applied at the discretion of the District.

3.0 Traffic Control Plan. This work shall be performed on a normal workday. No work requiring lane restrictions will be allowed between the hours of 5am to 8am and 4pm to 6pm. The Commission will be responsible for any traffic control deemed necessary by the engineer.

4.0 Installation

4.1 Description. The CTAD shall be installed so as to track all vehicles between 30 and 450 feet in advance of the stopbar for each approach. Contractor shall notify the Commission no less than 2 weeks of the date of installation of the mounting location of detector units. Any additional poles needed for proper placement of the units shall be furnished and installed by the Commission. All labor required to mount and connect the units outside of the signal cabinet shall be provided by the Commission.

NOTE: This section of US 61 will be widened during the Summer 2009. See attached construction plan sheet from JOB #J6S1961 for the future configuration. The quoted price shall include readjustment of the units by the contractor to the satisfaction of the engineer within 2 weeks of notification by the engineer once this work has been completed. The Commission will be responsible for any remounting or reaiming (including the cost of cables and mountings) of the units deemed necessary by the contractor.

5.0 Materials.

5.1 Advance Detector. Provide a WAVETRONIX SmartSensor Advance, or equivalent as accepted by the Engineer, with the following features:

- Per-vehicle range, speed, stop-bar ETA
- Dynamic density
- 25 simultaneous vehicle detections
- Advance detection at signalized intersections
- Digital wave radar
- SafeArrival technology for safe and efficient dilemma zone protection

- Qualified count filtering for more selective dilemma zone protection
- Dynamic Density detection for high-volume green extension
- Latched channel functionality for queue length detection
- Auto-configuration software for PC and Pocket PC
- Automatic and manual configuration of detection sensitivity in 5 ft. increments
- Upper and lower ETA filters
- ETA filter increment: 0.1 seconds

5.2 Contact Closure Card. Provide a CLICK 172 Contact Closure Card, or equivalent as accepted by the Engineer, with the following features:

- Operating temperature range -34 degrees to 74 degrees C.
- Plugs into a NEMA detector rack to provide detection events and obtain power.
- Autobauds to match the baud rate of an attached serial device
- Displays speed and detection count
- Presence, pulse, and actuation mode
- Automatically establishes communication with a serial device
- DIN rail mount

5.3 Power Converter. Provide a CLICK 202 AC to DC Power Converter, or equivalent as accepted by the Engineer, with the following features:

- 24VDC power 2A current when operating from -34 degrees to 74 degrees C
- Pluggable / keyed screw terminals
- DC OK operating LED
- DIN rail mount

5.4 Lightning Surge Protection. Provide a CLICK 200 Surge Protector at Advance Protector and controller cabinet, or equivalent as accepted by the Engineer, with the following features:

- Three-stage suppression design
 - First stage gas tubes
 - Second stage inductors and TVS diodes
 - Third stage resettable fuses and varistors
- Hot-swappable power and communication buses
- Surge protection for RS-485, RS-232 and DC power
- Pluggable / keyed screw terminals
- Unprotected communication connectors
- DIN rail mount

5.5 SmartSensor Mount. Provide a WAVETRONIX SmartSensor Mount, or equivalent as accepted by the Engineer, with the following features:

- Two axes of rotation for horizontal and vertical positioning
- Two contact points for attachment to circular or non-circular poles
- Supports a 15-lb. load
- Heavy duty aluminum construction

6.0 Construction Requirements.

6.1 Mounting Location. The CTAD shall be mounted:

- At a height that is within the manufacturer's recommended mounting heights.
- At an offset from the center of the lanes of interest that is consistent with the CTAD's maximum offset.
- In a forward-fire position, looking towards either approaching or departing traffic.
- So that it is pointed within 10 ft. (3 m) of the target point as defined by the manufacture's table of target points for mounting offsets and mounting heights.
- So that its vertical center line is within 5 degrees of the lanes of interest as described the manufacture's documentation.

6.2 Cabling. The cable end connector shall meet the MIL-C-26482 specification and shall be designed to interface with the appropriate MIL-C-26482 connector. The connector backshell shall be an environmentally sealed shell that offers excellent immersion capability. All conductors that interface with the connector shall be encased in a single jacket, and the outer diameter of this jacket shall be within the backshell's cable O.D. range to ensure proper sealing. The backshell shall have a strain relief with enough strength to support the cable slack under extreme weather conditions. Recommended connectors are Cannon's KPT series, and recommended backshells are Glenair Series 37 cable sealing backshells. The cable shall be the Orion Wire Combo-2207-2002-PVCGY or an equivalent cable that conforms to the following specifications:

- The RS-485 conductors shall be a twisted pair.
- The RS-232 and RS-485 conductors shall have nominal capacitance conductor to conductor of less than 71pF/Ft at 1 KHz.
- The RS-232 and RS-485 conductors shall have nominal conductor DC resistance of less than 16.5 ohms/(304.8m) at 68°F (20°C).
- The power conductors shall be one twisted pair with nominal conductor DC resistance of less than 11.5 ohms/(304.8 m) at 68°F (20°C).
- Each wire bundle or the entire cable shall be shielded with an aluminum/mylar shield with a drain wire.

The cable shall have a single continuous run with no splices.

The cable shall be terminated only on the two farthest ends of the cable.

The cable length shall not exceed the following limits for the operational baud rate of RS-485 communications:

Baud Rate	Cable Length
115.2 Kbps	300 ft. (91.4 m)
57.6 Kbps	600 ft. (182.9 m)
38.4 Kbps	800 ft. (243.8 m)
19.2 Kbps	1000 ft. (304.8 m)
9.6 Kbps	2000 ft. (609.6 m)

If communication is conducted over the RS-232 bus, then the RS-232 driver must be able to source and sink ± 7 mA or more.

The cable length shall not exceed the following limits for the operational baud rate of RS-232 communications:

Baud Rate	Cable Length
115.2 Kbps	40 ft. (12.2 m)
57.6 Kbps	60 ft. (18.3 m)
38.4 Kbps	100 ft. (30.5 m)
19.2 Kbps	140 ft. (42.7 m)
9.6 Kbps	200 ft. (61 m)

If 12 VDC is being supplied for the CTAD then the cable length shall not exceed 110 ft. (33.5 m).

If 24 VDC is being supplied for the CTAD then the cable length shall not exceed 600 ft. (182.9 m).

If a cable length of 600 ft. (182.9 m) to 2000 ft. (609.6 m) is required, the power cable shall be an ANIXTER 2A-1402 or equivalent

Both communication and power conductors can be bundled together in the same cable as long as the abovementioned conditions are met.

6.3 Induction Card Rack Interface. Install the contact closure card in the existing induction card rack and configure based on manufacturer's instructions to provide all needed detection outputs. Any power supply cards for the induction card rack needed for proper operation of the CTAD shall be provided and installed by the Commission.

6.4 Support. A factory certified representative from the supplier shall be available for on-site assistance for a minimum of one day during installation and shall provide two (2) days of local training after CTAD have been installed and are operational.

7.0 Acceptance Testing.

7.1 Develop a proposed test procedure for the CTAD and submit it to the Engineer for approval. It must include visual verification of vehicle detections being received. Each detector shall be tested separately. Revise the proposed test procedure until it is acceptable to the Engineer.

7.2 Provide all equipment and personnel needed to safely conduct the tests. Arrange for the Engineer's representative to witness the tests. Give the Engineer a report documenting the result of the tests.

8.0 Documentation and Software.

8.1 Prior to purchasing the CTAD system, submit five copies of catalog cut sheets and the environmental testing results to the Engineer for approval.

8.2 Provide five copies of the operation and maintenance manuals for the CTAD system.

8.3 Provide one copy of the software and cable needed to interface with the CTAD via

a laptop computer.

8.4 Contractor shall provide the CTAD installation kit to the Commission upon completion and acceptance of the project.

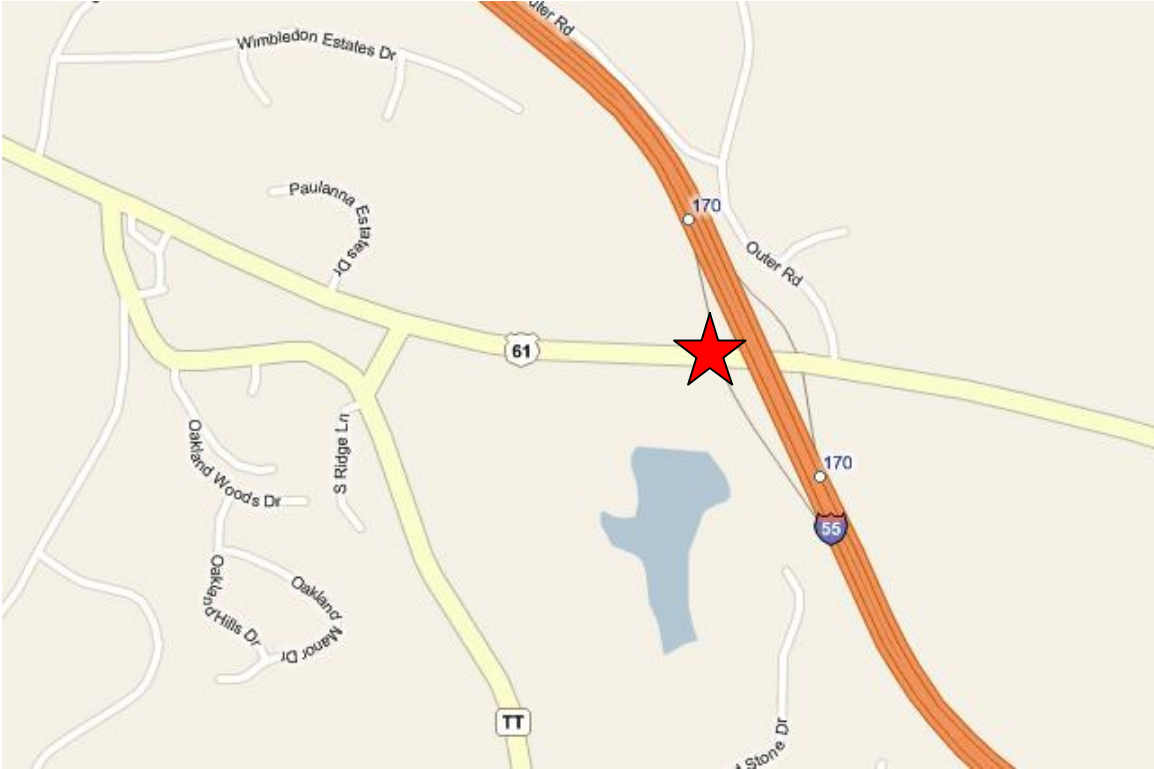
9.0 Guarantee. All items covered by this specification shall carry a minimum one-year guarantee from the date of acceptance against any imperfections in workmanship or materials.

10.0 Method of Measurement. Method of measurement shall conform to Sec 902.

11.0 Basis of Payment. Payment for items covered by this specification include the documentation and acceptance testing, in addition to all materials and equipment necessary for a fully operational system.

Item No.	Type	Description
Xxxxx	Lump Sum	Continuous Tracking Advance Detector System

Site Location



Northbound US 61 approaching SB 55 ramps



Southbound on US 61 approaching SB 55 ramps





Standing at the Southbound Stopbar / Facing West



Standing at Northbound Stopbar / Facing East



Standing Next to Signal Pole / Facing East

